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Pesticides and Drinking Water at New Hampshire's Schools and Daycares

Summary of the 2010 Sampling Project and Measures Schools Must Take to Protect Human Health and the Environment When Using Pesticides

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Ensuring safe and adequate drinking water supplies requires maintaining the quality and availability of present and future water supply sources, because in the long run it is less expensive and more protective of public health to prevent contamination than it is to treat water to meet health standards, and it is less expensive to use existing sources than it is to develop new ones. New contaminants of concern continue to emerge, potentially requiring more costly treatment of source waters if they have not been adequately protected. Municipalities and water suppliers have crucial roles in managing activities that affect source water quality and availability. DES's primary role is to provide technical and financial assistance and to enforce state regulations that serve to protect the state's sources of drinking water. Effective protection relies on the combined efforts of the state, water suppliers, municipalities, businesses, institutions, and individuals whose activities have the potential to affect source water quality and availability.

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Introduction

In 2010, the New Hampshire Department of Environmental Services and United States Department of Agriculture (USDA) completed a study to determine the occurrence of pesticides in 49 schools and daycares throughout New Hampshire (see Figure 1). Groundwater samples were obtained from schools and daycares that utilize an onsite well. Sampling sites were selected to be representative of all regions of the state and were biased where possible towards specific locations with potential nearby pesticide application areas, agricultural lands and/or irrigation activities nearby. The samples were collected in November and December 2010 and analyzed for ninety-two pesticides and degradates of pesticides (Table 1). The samples were analyzed at the Minnesota Department of Agriculture's laboratory - a cooperative state in USDA's Pesticide Data Program.

At least one pesticide was detected in water samples collected from 12 of the 49 school or daycare facilities sampled. In other words, pesticides were detected in the drinking water of 24% of the schools or daycares sampled. Fourteen of the 92 compounds analyzed for were detected at least at one facility. Pesticide compounds analyzed for were detected a total of 29 times for the entire sampling program. However, all concentrations detected were much lower than associated drinking water standards or estimated health guidance levels (Table 2). The concentrations of pesticides that were detected were found to be at levels ranging from 0.1% to 11% of the applicable drinking water standard or estimated health guidance standard.

Three pesticides, atrazine, metolachlor, and alachlor constitute almost half the reported herbicide use in New Hampshire. Their greatest use is controlling weed growth in the production of corn for dairy operations and only persons possessing a pesticide applicator's license may purchase and use these pesticides. These pesticides or their breakdown products represented 23 of the 29 instances that pesticides were detected in water samples. Vegetation growth control pesticides generally available for purchase to the public represented five of the six remaining pesticide detections. There was only one occurrence of an insecticide being detected in groundwater.

Use of Pesticides at Schools

Pesticides may only be applied at schools or daycares by applicators that are licensed as "Commercial for Hire" or "Commercial Not for Hire" pesticide applicators. A Commercial For-Hire applicator is a person who applies pesticides commercially on a contract basis - lawn care and exterminators being examples of such applicators. A school might contract with such a person to do its pesticide applications. Alternatively a school might employ a person such a groundskeeper or janitor who holds a Commercial Not For Hire license to do its pesticide applications. The majority of pesticide applications to schools, however, are made on a "for-hire" basis. To become certified as a commercial applicator a person must pass various examinations, and must maintain that certification through continuing education.(see www.nh.gov/agric/divisions/pesticide_control/documents/cnfh.pdf). Furthermore, any commercial application of pesticides to turf, such as playing fields or other lawn areas at a school, must comply with the turf notification rules under Pes 508.01 of the Administrative Rules of the Pesticide Control

Board. This notification must be in the form of posted signs, posting on bulletin boards, direct written notification or some combination of the three.

Schools should develop and implement integrated pest management program by combining the use of biological, cultural, physical, and chemical tactics in a way that minimizes economic, health, and environmental risks. The USEPA has developed materials that schools can use to assist in the development of these programs (see http://www.epa.gov/pesticides/ipm/#bkmrk2).

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Figure 1: Daycares and Schools Pesticide Sampling Locations

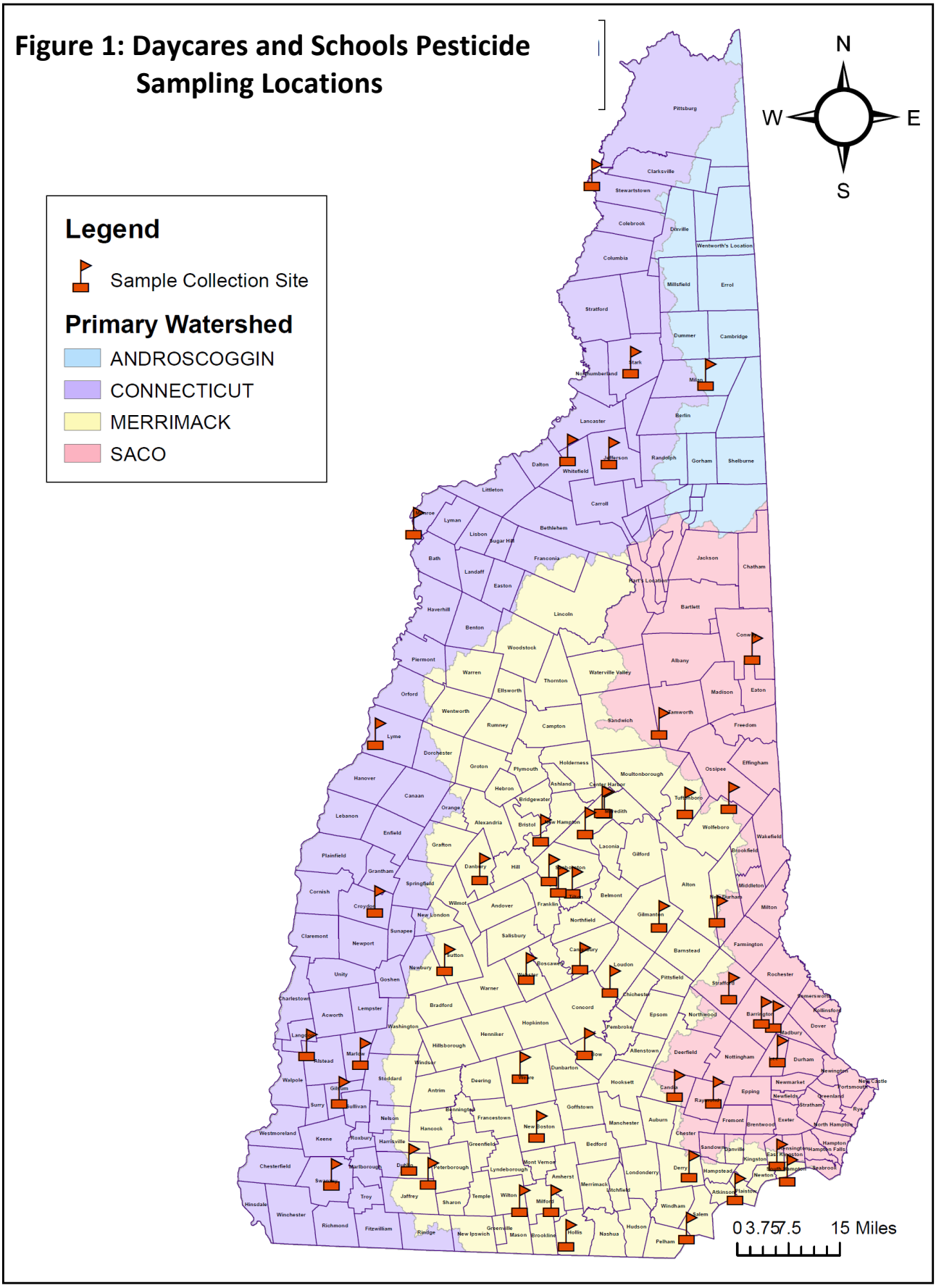

Table 1. Pesticides and Degradates Analyzed at Schools and Daycares in 2010
[Pesticide trade names and degradates and abbreviations are showing in brackets)
##/## Limit of Detection/Limit of Quantification - part per trillion

2,4,5-T 15/50	Clomazone 30/100	Hexazinone (Velpar) 3/10	Metribuzin(Lexone, Sencor) 30/100
2,4-D (Dacamine, Weed-B-Gon) 2.5/8.3	Clopyralid (Stringer, Lontrel) 12.5/41.6	Hydroxy atrazine 2.0/6.7	Metsulfuron methyl (Ally, Escort) 7/23.3
2,4-DB (Butoxone, Butyrac) 4/13.3	Cyanazine (Bladex) 50/200	Imazamethabenz acid 3/10	Myclobutanil (Eagle, Nova) 50/200
Acetamiprid 4.5/15	DCPA 30/90	Imazamethabenz methyl 1.5/5	Neburon(Granurex, Propuron) 3/10
Acetochlor (Guardian, Harness, Relay) 10/50	Desethyl atrazine 15/45	Imazamox 4/13.3	Nicosulfuron (Accent, OneHope) 8/26.6
Acetochlor ethanesulfonic acid (ESA) 9/30	Desethyl-desisopropyl atrazine 50/200	Imazapic 3/10	Norflurazon (Zorial, Solicam) 6/20
Acetochlor oxanilic acid (OA) 10/33.3	Desisopropyl atrazine 50/200	Imazapyr (New Path, Pursuit) 2.5/8.3	Oxamyl (Vydate) 7.5/25
Alachlor (Alanex, Lasso, Shroud) 10/50	Diazinon (Basudin, Spectracid, Knoxout)30/100	Imazaquin 5/16.7	Siduron (Tupersan) 2/6.7
Alachlor ethanesulfonic acid (ESA)12.5/41.6	Dicamba (Banvel, Banex) 15/50	Imazethapyr 2.5/8.3	Simazine (Aquazine, Princep) 30/100
Alachlor oxanilic acid (OA) 10/33.3	Dichlobenil 5/15	Imidacloprid 6/20	Sulfometuron methyl (Oust)2.5/8.3
Aldicarb sulfone (Standak, aldicarb degradate) 4.5/15	Dichlorprop (Weedone, Polymone) 15/50	Isoxaflutole 7.5/25	Tebuconazole (Elite) 50/200
Aldicarb sulfoxide (aldicarb degradate) 15/50	Dimethenamid 10/50	Linuron 6/20	Tebupirimfos 30/100
Atrazine (Aatrex, Atranex) 10/50	Dimethenamid ethanesulfonic acid (ESA)	Malathion 30/100	Tebuthiuron(Graslan,Spike) 30/100
Azoxystrobin 3/10	Dimethenamid oxanilic acid (OA) 3/10	Malathion oxygen analog 600/600	Terbufos (Counter, Contraven) 30/150
Bensulfuron methyl (Escuri, Londax) 5/16.7	Dimethoate (Trounce) 50/200	MCPA 1.5/5	Tetraconazole 30/150
Bentazon (Basagram, Bentzone)0.3/0.8	Disulfoton sulfone(disulfoton degradate)6/20	MCPB 3/10	Thiamethoxam 7.5/25
Boscalid 60/300	Diuron (Durashield, Karmex) 4/13.3	Mecoprop (MCPP) 15/50	Thifensulfuron methyl 5/16.7
Bromacil (Hyvar X) 6/20	EPTC (Eptam, Eradicane) 30/100	Metalaxyl (Apron, Ridamil, Subdue)2.5/8.3	Thiobencarb (Bolero, Saturn) 2.5/8.3
Carbaryl (Carbatox, Sevin) 7.5/25	Ethalfluralin 30/150	Methidathion (Supra) 100/300	Tri Allate 30/100
Carbofuran (Furadan, Futura) 4/13.3	Flufenacet oxanilic acid (OA) 2.5/8.3	Methomyl (Lannate, Nudrin) 7.5/25	Triasulfuron 7/23.3
Chlorimuron ethyl (Classic, Darban, Lory) 6/20	Fluometuron (Cotoran) 50/150	Metolachlor (Bicep) 15/70	Triclopyr (Garlon) 15/50
Chlorothalonil 30/100	Fonofos (Dyfonate) 30/150	Metolachlor ethanesulfonic acid (ESA) 3/10	Trifluralin (Treflan) 30/150
Chlorpyrifos (Dursban, Lorsban) 30/100	Halosulfuron methyl 9/30	Metolachlor oxanilic acid (OA) 3/10	Triticonazole 500/1000

Table 2. Pesticides and Degradates Detected in Drinking Water Wells at Schools and Daycares in 2010

Detected Pesticide or Degradate/Pesticide Type	Use	Number of Sites Detected	Maximum Concentration (part per trillion)	Drinking Water Standard/Estimated Health Guidance (part per trillion)	Drinking Water Standard or Health Guidance Source
Metolachlor ethanesulfonic acid (ESA)/Herbicide	Degradate of Metolachlor which is used to control annual grasses and broadleaf vegetation	6	184	700,000	NH AGQS for Metolachlor
Alachlor ethanesulfonic acid (ESA)/Herbicide	Degradate of Alachlor which is used to control annual grasses and broadleaf vegetation	5	444	2,000	EPA MCL for Alachlor
Desethyl atrazine/ Herbicide	Degradate of atrazine. Broadleaf and grassy weeds in corn and other crops. Only licensed applicators may use this pesticide.	3	59.6	3,000	EPA MCL for Atrazine
Desisopropyl atrazine/ Herbicide	Degradate of atrazine. Broadleaf and grassy weeds in corn and other crops. Only licensed applicators may use this pesticide.	3	89	3,000	EPA MCL for Atrazine
Atrazine/ Herbicide	Broadleaf and grassy weeds in corn and other crops. Only licensed applicators may use this pesticide.	2	349	3,000	EPA MCL
Hydroxy atrazine/ Herbicide	Degradate of atrazine. Broadleaf and grassy weeds in corn and other crops. Only licensed applicators may use this pesticide.	2	39.3	3,000	EPA MCL for Atrazine
Alachlor oxanilic acid (OA)/ Herbicide	Degradate of Alachlor which is used to control annual grasses and broadleaf vegetation	1	12	2,000	EPA MCL for Alachlor

Table 2. Pesticides and Degradates Detected in Drinking Water Wells at Schools and Daycares in 2010 (continued)

Detected Pesticide or Degradate/Pesticide Type	Use	Number of Sites Detected	Maximum Concentration (part per trillion)	Drinking Water Standard/Estimated Health Guidance (part per trillion)	Drinking Water Standard or Health Guidance Source
Diuron/ Herbicide	Used to control annual grasses and broadleaf vegetation	1	134	4,000	EPA Reference Dose
Imazapyr/ Herbicide	Used to control annual grasses and broadleaf vegetation	1	882	5,000,000	EPA Registration Eligibility Decision
Imidacloprid/ Insecticide	As an insecticide spray, it is used on a wide variety of agricultural crops, ornamentals, and turf. It is also marketed for termite control, for flea control on pets, and for household cockroach control.	1	124	110,000	Oregon State University National Pesticide Information Center
Metolachlor oxanilic acid (OA)/Herbicide	Degradate of metolachlor which is used to control grassy weeds often in combination with other herbicides	1	79.3	700,000	NH AGQS for Metolachlor
Norflurazon/ Herbicide	Used to control annual grasses and broadleaf vegetation	1	17.4	80,000	EPA Reference Dose
Siduron/ Herbicide	Pre-emergence control of crabgrass and some other annual grass weeds in turf.	1	3.82	300,000	EPA Registration Eligibility Decision
Sulfometuron methyl/ Herbicide	Used to control annual and perennial grasses and broad leaved weeds in non-crop land	1	35	550,000	EPA Registration Eligibility Decision